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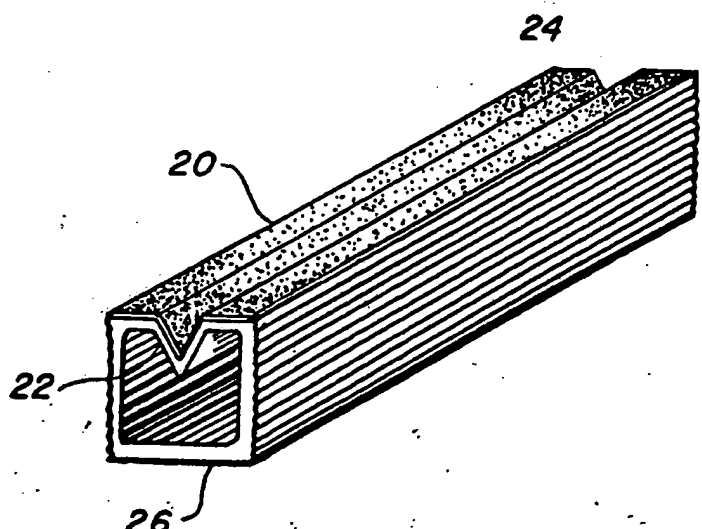
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>4</sup> :</b>  <b>B24D 15/02, B26B 29/00</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 87/ 00108</b>  <b>(43) International Publication Date:</b> 15 January 1987 (15.01.87)
<p><b>(21) International Application Number:</b>    PCT/US85/01285</p> <p><b>(22) International Filing Date:</b>            8 July 1985 (08.07.85)</p> <p><b>(71)(72) Applicants and Inventors:</b> FIORE, Charles, E. [US/US]; 12914 Valleyhart Drive, Studio City, CA 91604 (US). GUGLIELMI, Salvatore [US/US]; 22968 Victory Boulevard, #155, Woodland Hills, CA 91367 (US).</p> <p><b>(74) Agent:</b> COTA, Albert; 5460 White Oak Avenue, Suite A-331, Encino, CA 91316 (US).</p> <p><b>(81) Designated States:</b> AT (European patent), BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), SE (European patent), US.</p>		<p><b>Published</b> <i>With international search report.</i></p>
<p><b>(54) Title:</b> WINDSHIELD WIPER BLADE RENEWER</p> <div style="text-align: center; margin: 20px;">  </div> <p><b>(57) Abstract</b></p> <p>A hand held-tool consisting of a square elongated block (20) having an angular groove (22) on the top with an abrasive surface (24) disposed upon the top and groove (22). An automotive type windshield wiper blade is placed in the groove (22) and rubbed back and forth abrading the surface of the blade thereby eroding the material in a controlled manner to renew the tip that is in contact with the windshield. Another embodiment utilizes the same block (20) except the groove (22) has a cutting blade (36) inbedded therein slitting the workpiece on the end renewing the wiping surface. Still another embodiment utilizes a pair of round rods (40) in parallel relationship allowing a fresh unused portion containing the abrasive surface (24) to be exposed prolonging the utility of the tool.</p>		

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WINDSHIELD WIPER BLADE RENEWERTECHNICAL FIELD

The invention relates to abrading tools in general and more specifically to a grooved block having an abrasive surface therein for grinding the edge of a windshield wiper blade.

BACKGROUND ART

Previously many types of abrading devices have been in use to sharpen metallic cutting implements such as knives, scissors, etc., and pointed devices including rods and hooks. These implements all contain a cutting surface with an abrasive face in some type of an angular plane. A search of the prior art did not disclose any patents that read directly on the claims of the instant invention. However, the following U.S. patents were considered related:

	<u>PATENT NUMBER</u>	<u>INVENTOR</u>	<u>ISSUED</u>
	4,272,925	Graves	16 June 1981
	2,360,079	Smith	10 October 1944
20	1,851,520	Moller	29 March 1932
	1,801,802	Conyngham	21 April 1931

Graves teaches a sharpening apparatus with a pair of cylindrical ceramic rods in side by side relationship. The rods are removable and mountable in other relationships within a portable base.

Smith discloses a sharpening device with a plurality of flat surfaces spaced at an obtuse angle to each other so that a thin razor blade is depressed and

moved back and forth on an abrasive surface. The channel like member is made of glass, porcelain, whetstone or carborundum and is of a one piece construction.

Moller employs a pair of renewable elements preferably made of carborundum molded into a section of a cylinder. The inner side of each cutting element is a curved surface and they are held tightly in contact with each other by the resiliency of a set of holders. The implement to be sharpened is pressed against the opposed elements and drawn lengthwise through the device.

Conyngham utilizes a wheel or disc composed of emery, carborundum or like abrasive material on a stand with a conical wooden guide over which a washer is placed to connect the assembly. The wooden disc is superimposed so as to provide a beveled annular space between that of the elements so as to provide an angular guide to obtain a uniform sharpening angle upon the flat surface of the wheel.

#### DISCLOSURE OF THE INVENTION

20

The modern automobile, truck and airplane all utilize a windshield wiper consisting of a resilient blade springingly held against the external surface of the windshield and radially wiped thereacross. As the wiper blade itself is, of necessity, mounted on the outside, it is exposed to the deleterious environments such as rain, salt spray, sunshine ozone etc. normally encountered in various parts of the world. As the blade is fabricated in most cases of a resilient synthetic rubber material, exposure to these environs causes a deterioration of the surface especially at the apex of the tip which allows the function to be

30

hampered even with minor decadence. It is therefore a primary object of the invention to provide an easy to use method of renewing the wiper blade rather than requiring expensive replacement that has presently been  
5 accepted as the only alternative.

An important object of the invention provides a tool that grinds or cuts away the damaged edge of the blade exposing a new edge of parent material still possessing all of the properties inherent in the original  
10 equipment. As the extreme edge of the blade deteriorates, first the invention acts only upon this area as the remainder of the blade has sufficient integrity to function properly without alteration.

Another object of the invention allows the blade  
15 to be sharpened while in place making it unnecessary to remove the blade at all during this procedure. Many vehicles utilize blade holding arms that have a detented arm position away from the windshield to allow unobstructed cleaning of the window. This position is  
20 employed when sharpening and restoring the blade with the invention as the device is linearly rubbed back and forth while the blade is contiguously engaged in the groove. This is accomplished with one hand holding the blade and the other the tool.

25 Still another object of the invention maintains the optimum angle of the blade edge. As many wiper blades are designed with a series of raised projections on the exposed sides, the invention cuts the material away at the most advantageous point creating a renewed  
30 blade that does not leave streaks or chatter when the windshield is partially dry.

The utility of the invention may be expanded to include sharpening hand operated squeegees for cleaning windows as yet another object. As the device

incorporates an abrasive groove, any cleaning apparatus having a sharp resilient blade may be enhanced by the use of the invention and as such is not limited to vehicular applications only. The design of the invention also  
5 allows the wiper blade to seek its own depth in the groove.

A further object of the invention, in one embodiment, allows the wiper blade to be hollow ground by using a pair of cylindrically shaped rods. Further this embodi-  
10 ment allows the rods to be rotated changing the worn abrasive surface to a new area extending the life of the apparatus.

These and other objects and advantages of the present invention will become apparent from the subsequent  
15 detailed description of the preferred embodiment and the appended claims taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is an isometric view of the preferred  
20 embodiment.

FIGURE 2 is a side elevation view of the preferred embodiment partially cut away to expose the groove in the center.

FIGURE 3 is an end view of the preferred embodi-  
25 ment with a hollow extruded body.

FIGURE 4 is an end view of the preferred embodiment with a solid block of rigid material for a body.

FIGURE 5 is an isometric view of the second embodiment using a sharp thin blade for cutting the edge of  
30 the wiper.

FIGURE 6 is an end view of the second embodiment with a "V" groove and hollow extruded body.

FIGURE 7 is an end view of the second embodiment with a rectangular recessed groove and a hollow extruded body.

FIGURE 8 is a side elevational view of the second embodiment partially cut away to illustrate the blade within the groove and the body of solid material.

FIGURE 9 is an end view, as above, with a rectangular recessed groove.

FIGURE 10 is an end view, as above, with a "V" recessed groove.

FIGURE 11 is a partial isometric view of the third embodiment with a pair of connecting cylindrical rods.

FIGURE 12 is a side elevational view of the third embodiment partially cut away to expose the fastening means.

FIGURE 13 is an end view of the above.

FIGURE 14 is a side elevational view of the third embodiment partially cut away to expose the screws and brackets utilized as fastening means.

FIGURE 15 is an end view of the third embodiment.

#### BEST MODE FOR CARRYING OUT THE INVENTION

The best mode for carrying out the invention is presented in terms of a preferred, second and third embodiment. All three embodiments are primarily designed to include a grooved abrasive tool for manually renewing automotive type windshield wiper blades. The preferred embodiment illustrated in FIGURES 1-4 utilizes a square elongated block 20 having an angular groove 22 on the top which includes an abrasive surface 24.



The elongated block 20 may be a hollow extrusion of thermoplastic material 26 having serrations on each side as shown in FIGURES 1 and 3 or may be a solid block 28 of rigid material depicted in FIGURE 4. The type of thermoplastic utilized includes any suitable substance  
5 such as phenylene oxide, polycarbonate polyethylene, polypropylene, polystyrene and acrylonitrile butadiene styrene. The solid block may consist of wood, composition board, aluminum, pumice or any other material having  
10 rigid structural qualities suitable for the purpose.

The abrasive surface 24 on top of the block 20 consists preferably of a so called wet or dry sandpaper adhesively bonded to the top and angular groove 22. This sandpaper is well known in the art and is so named  
15 for its ability to be used in a dry condition for applications where the material removed by abrasion is of such a nature that it freely dissipates and does not particularly clog the surface of the material. Some work pieces such as paint has a tendency to stay upon  
20 the surface of the abrasive paper therefore, its ability to be wetted with water helps to prevent permanent clogging and extends the cutting life of the substance. In the invention application the latter feature is relied upon as synthetic rubber such as utilized by an  
25 automotive wiper blade is best cut using the medium of water as a transporting agent to remove loose particles and prevent accumulations on the abrasive surface. While any suitable grade of sandpaper may be utilized, it has been found that 220 grit wet or dry sandpaper  
30 such as manufactured by the 3-M Company has proven to be optimum in this application.

The sandpaper may be permanently bonded to the top of the block 20 and groove 22 with any suitable adhesive material also well known in the art. Further

the abrasive surface 24, instead of being paper, may consist of a liquid hardening into a solid in which granulars of grit such as carborundum are embedded creating an integral abrasive surface possessing the same qualities as the sandpaper. In the event, pumice is used as the solid block material 28, the addition of a secondary abrasive surface is unnecessary as the material itself contains these qualities.

The angle of the groove 22 becomes important in renewing the blades surface. As not all manufacturers of automotive type blades utilize the same shape, it has been found that the proper angle has fallen into two categories. A wide groove of 60 plus or minus 5 degrees has proven best for some blades while 50 plus or minus 5 has been optimum for others. It must therefore be the option of the user to select the best angle for his particular make of automobile or manufacturer of after market equipment.

In operation the device is used by submerging in water and pulling the wiper blade away from the window into its extended position and inserting the blade into the groove 22 and rubbing with a linear motion back and forth. The invention is again wetted in water and the procedure is repeated until the surface of the blade is evenly abraded and a new finish is apparent. The blade is wiped clean and returned to its at rest position on the window.

The second embodiment is pictorially illustrated in FIGURES 5-10 consists of a block 20 the same as the preferred embodiment in construction but differs in that the angular groove 22 is replaced with a depressed groove 30. This groove 30 optionally involves an angular groove 32 shown in FIGURES 5, 6 and 10 or a rectangular recess 34 depicted in FIGURES 7 and 9. This groove 30 in either case guides the wiper blade at a controlled depth.

A sharp cutting blade 36 is disposed at right angles through the groove 30 near the bottom allowing the wiper blade to be inserted into the groove 30 and then manually pulled against the sharp blade 36 cutting off the outermost portion in a uniform manner renewing the extreme edge blade. Inasmuch as wiper blades differ in configuration, the same situation arises as previously discussed, therefore the groove 30 is in the two configurations that of a "V" angular shape 32 and a rectangular shape 34 compensating for the variation by user pre-selection.

The cutting blade 36 is a thin metallic structure not unlike a razor blade in construction and is well known in the art. The blade 36 is inserted into tight fitting slot 38 in the block 20 near one end with the sharp surface facing the center. This location allows the wiper blade to be stabilized contiguously on the bottom of the groove 30 and to cut the tip off evenly when slid upon the blade 36.

The third embodiment is shown in FIGURES 11-15 and consists of a pair of cylindrically shaped elongated rods 40 that are positioned in parallel relationship touching at the radial intersection. These rods 40 also have an abrasive surface 24, as in the preferred embodiment, with the angle dependent upon the radius thereof. The function of movement upon the abrasive surface is also exactly the same as the preferred embodiment.

The rods 40 may be either hollow 42 as illustrated in FIGURES 11-13 or solid 44 as shown in FIGURES 14-15. The hollow configuration 42 is utilized in conjunction with a metallic "U" shaped round wire yoke 46 having fastening means on each end in the form of threads. A mounting bracket 48 having a pair of bores 50 in

spaced relationship with the yoke 46 is made of a metallic plate and further contains a notch 52 which is formed beneath the centerline of the yoke 46. This bracket 48 is attached to the rods 40 with hexagonal shaped nuts 54 holding the assembly together in tension.

When attached together the yoke 46 holds the rods 40 in parallel relationship providing a rigid fixed position for the abrasive surface 24 and further allows the rods 40 to be rotated exposing a new fresh surface as desired by loosening the nuts 54 or the threads of the yoke 46. Extended use is realized by the renewed surface of the rods 40 as the adjustment may be made many times before the utility of the abrasive surface 24 is completely depleted.

In a final version of the third embodiment shown in FIGURES 14-15 the adjustment and utility is the same as above except the rod 40 is solid 44 and a pair of mounting brackets 48 are utilized attached to the solid rod 44 by self threading screws 56.

The hollow rods 42 are fabricated of a thermoplastic or similar material, the same as previously disclosed and the solid rods 44 may be again thermoplastic or wood with a hole drilled in the end to start the self threading screws 56. An alternate material may be metal or composite material using wood chips or sawdust with a plastic filler well known in the art.

While the invention has been described in complete detail and pictorially shown in the accompanying drawings it is not to be limited to such details, since many changes and modifications may be in the invention without departing from the spirit and the scope thereof. Hence, it is described to cover any and all modifications and forms which may come within the language and scope of the claims.

CLAIMS

1. A hand held windshield wiper blade edge renewal device comprising: a square elongated block having an angular groove on the top thereof, and an  
5 abrasive surface disposed upon said top and groove, having tritulative characteristics therewith, defining the tactile qualities to grind away eroded material from the exterior surface of said wiper blade by the manual linear rubbing of the device upon the blade  
10 while contiguously engaged within the groove.
2. The invention as recited in claim 1 wherein said elongated block further comprises a hollow extrusion of thermoplastic material having serrations on each side, and said abrasive surface further  
15 consisting of a wet or dry sandpaper adhesively bonded to said top and groove in a permanent manner.
3. The invention as recited in claim 1 wherein said elongated block further comprises a solid block of rigid material and said abrasive surface further  
20 consisting of a wet or dry sandpaper adhesively bonded to said top and groove in a permanent manner.
4. The invention as recited in claim 1 further comprising said angular groove on said top having an angle of 60 plus or minus 5 degrees providing a renewed  
25 surface of said wiper blade angularly corresponding thereunto.

5. The invention as recited in claim 1 further comprising said angular groove on said top having an angle of 50 plus or minus 5 degrees providing a renewed surface of said wiper blade angularly corresponding thereunto.

6. A hand held windshield wiper blade edge renewal device comprising a square elongated block having a depressed groove on the top thereof, and a sharp cutting blade disposed at right angles through the groove near the bottom allowing said wiper blade to be inserted into the groove and when manually pulled against the sharp blade cutting off the outermost portion in a uniform manner renewing the edge of the blade for use on a windshield.

7. The invention as recited in claim 6 wherein said elongated block further comprises a hollow extrusion of thermoplastic material.

8. The invention as recited in claim 6 wherein said elongated block further comprises a solid block of rigid material.

9. The invention as recited in claim 6 wherein said depressed groove further comprises an angular groove for guiding said wiper blade at a controlled depth in relation to said cutting blade.

10. The invention as recited in claim 6 wherein said depressed groove further comprises a rectangular recess for guiding said wiper blade at a controlled depth in relation to said cutting blade.

11. A hand held windshield wiper blade edge renewal device comprising a pair of cylindrical elongated rods in parallel contiguous relationship having an abrasive surface disposed on the periphery with tritulative characteristics therewith, defining tactile qualities to grind away eroded material from the exterior surface of said wiper blade by the manual linear rubbing of the device upon the blade while engaged in the groove formed between the two rods.

10 12. The invention as recited in claim 11 wherein said elongated rods further comprise a hollow extrusion of thermoplastic material.

13. The invention as recited in claim 11 wherein said elongated rods further comprise a solid block of rigid material.

14. The invention as recited in claim 11 further comprising a metallic "U" shaped round wire yoke having fastening means on each end, and a bracket having a pair of bores in alignment with said yoke retaining said elongated rods in parallel relationship when disposed within, said fastening means urging compliance with the ends of said rods providing a rigid fixed position with rotatable adjustment thereof.

15. The invention as recited in claim 11 further comprising a pair of brackets rotatably fastened to the ends of said elongated rods in such a manner as to provide manual adjustment while maintaining fixed parallel relationship thereof.

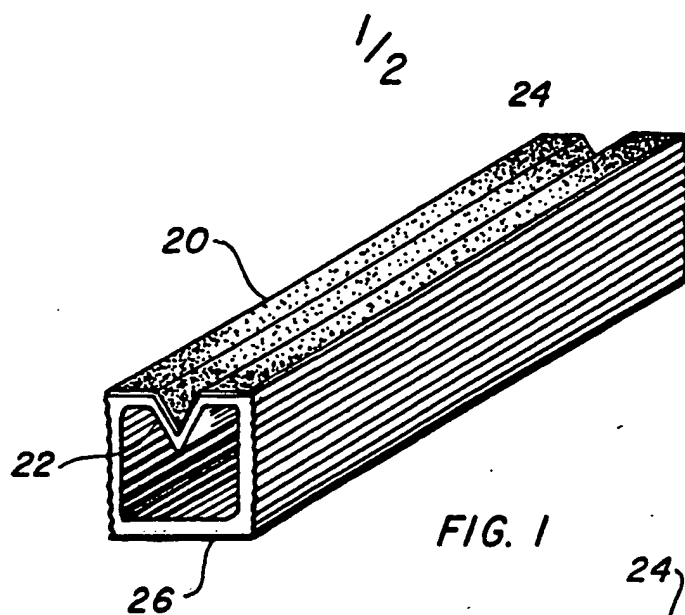


FIG. 1

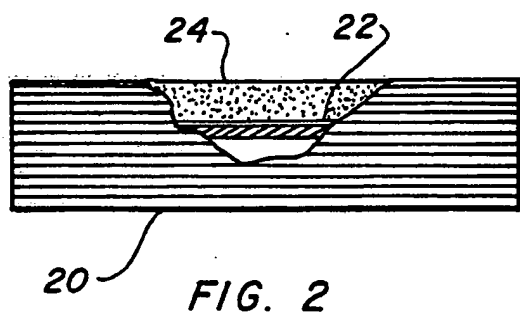


FIG. 2

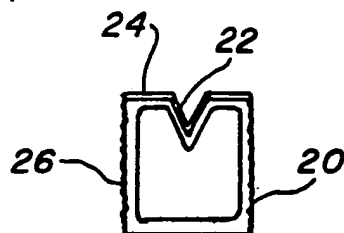


FIG. 3

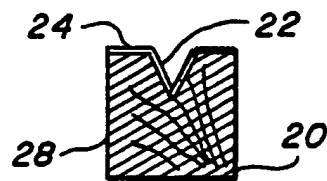


FIG. 4

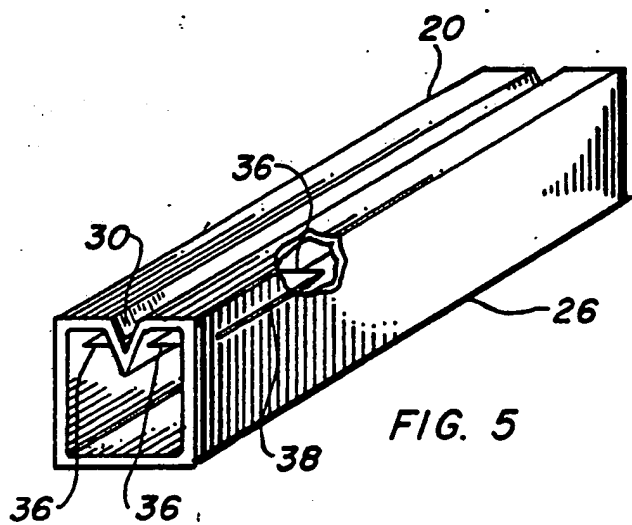


FIG. 5

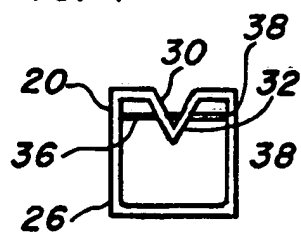


FIG. 6

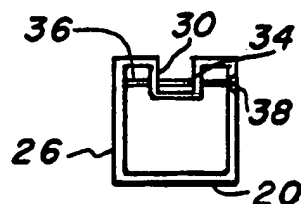


FIG. 7



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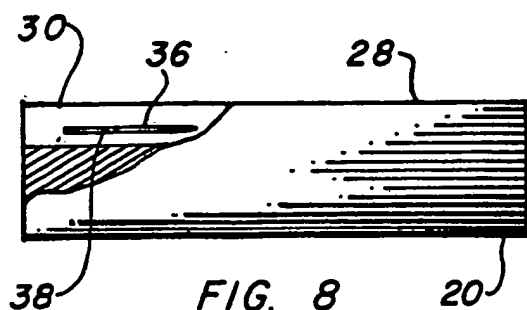


FIG. 8

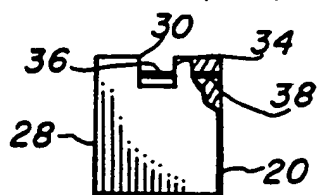


FIG. 9

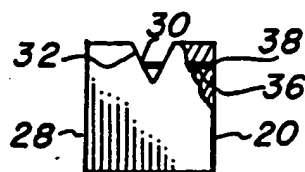


FIG. 10

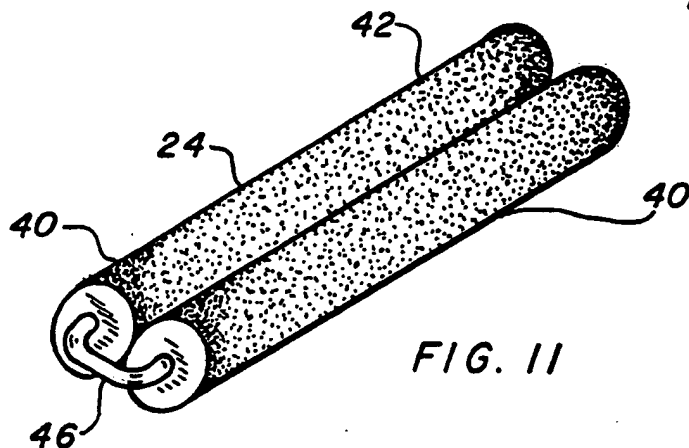


FIG. 11

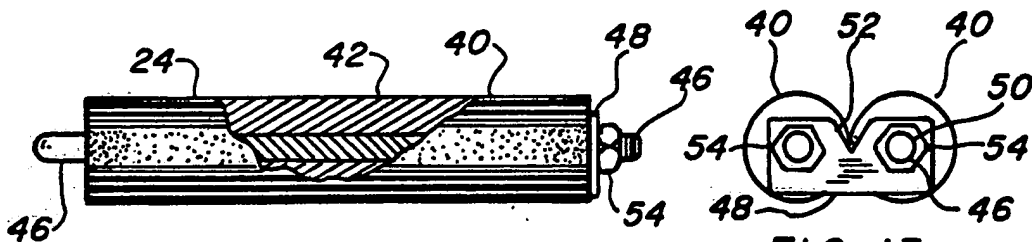


FIG. 12

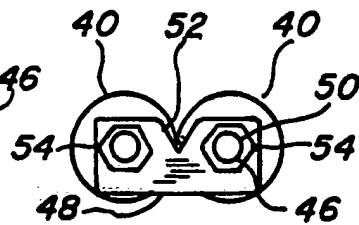


FIG. 13

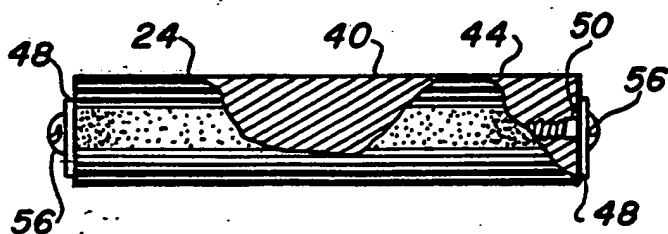


FIG. 14

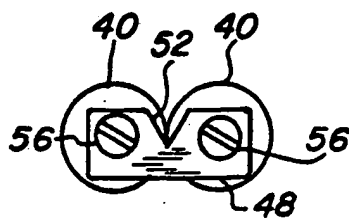


FIG. 15

# INTERNATIONAL SEARCH REPORT

International Application No PCT/US85/01285

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>1</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. B24D 15/02; B26B 29/00		
U.S. Cl. 51/39, 214; 30/289		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>4</sup>		
Classification System	Classification Symbols	
U.S.	51/358, 391, 392, 393, 205.R, 205.WG, 211.R, 214; 30/124, 289; 83/856, 869; 144/155, 184	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>		
Category <sup>6</sup>	Citation of Document, <sup>15</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>
Y	US, A, 3,708,924, Published 09 January 1973 Prunchak	1-5
Y	US, A, 2,982,059, Published 02 May 1961 Trussell	1-5
Y	US, A, 3,114,352, Published 17 December 1963 Mathisen	1-5
X	US, A, 4,175,599, Published 27 November 1979 Dubois	6-10
X	US, A, 2,388,695, Published 13 November 1945 Kriewaldt	6-10
X	US, A, 4,272,925, Published 16 June 1981 Graves	11-15
X	FR, A, 649,512, Published 24 December 1928 Drapier et al.	11-15
<p><sup>16</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
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International Searching Authority <sup>21</sup>	Signature of Authorized Officer <sup>22</sup>	
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